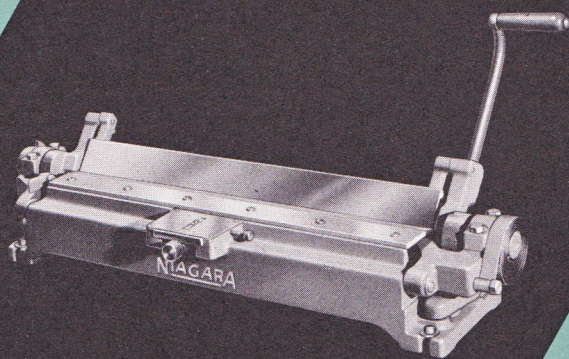
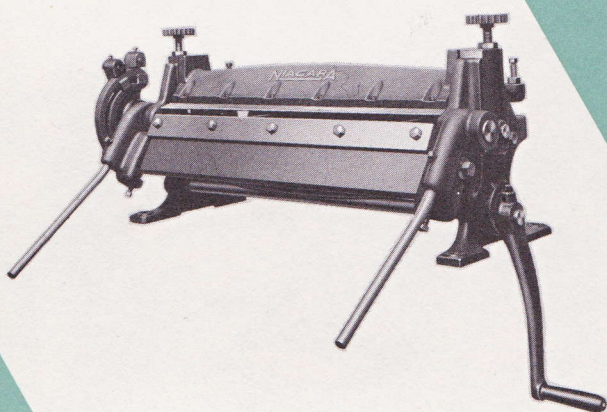


# NIAGARA



## folders and brakes



BULLETIN 74C



# NIAGARA

## ADJUSTABLE BAR FOLDERS



FIG. 1 Model 3 Adjustable Bar Folder,  
with spiral spring counterbalance  
(standard equipment)

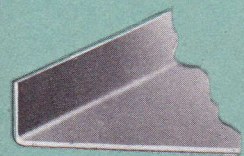


FIG. 2 Right Angle Fold

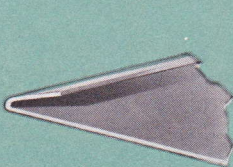


FIG. 3 Sharp Fold

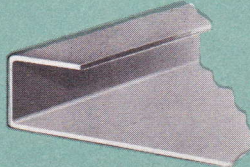


FIG. 4 Right Angle Folds  
(Two operations)

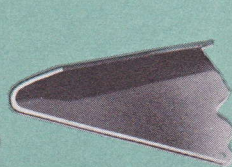


FIG. 5 Rounded Fold

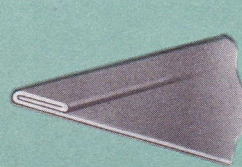


FIG. 6 Double Hem  
(Four operations)

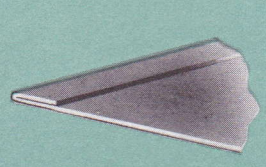


FIG. 7 Hem  
(Two operations)

Niagara Bar Folders are accurate, ruggedly built machines for making folds of limited widths along the edge of a sheet. Their universal adaptability and rapid operation have, for years, established them as a favorite and exceptionally important piece of equipment in the sheet metalworking industry.

Examples of some of the many types of folds, illustrated on this page, demonstrate the versatility of Niagara Bar Folders. Note particularly how ideal these machines are for producing narrow, sharp, close

and *accurate* folds such as those which are essential to lock seams. Automatic clamping of the edge of the sheet, before the formation of the bend, helps make this possible . . . an important feature that speeds up production in duplicate work.

Available in four sizes, in both Hand Operated (Fig. 1, above) and Air Actuated Models (Fig. 12, Page 4), Niagara Adjustable Bar Folders incorporate numerous unique operating features.



# hand operated models

## Clamping and folding with only one motion of operating handle

With the sheet first inserted between the Folding Blade and the Jaw (Fig. 8), it is held against the Gage with one hand while the Operating Handle is pulled forward with the other. This single motion instantly and automatically raises the Jaw (Fig. 9), gripping the sheet between it and the Folding Blade, while the Folding Bar and Wing travel the remaining distance to complete the bend. Clamping and folding are practically simultaneous!

## Finished work quickly removed

As the Operating Handle is returned to its starting point, all moving parts assume their original positions, releasing the clamping pressure for fast and easy removal of the work.

## Stops determine angle of bend

Three stops (Fig. 11) are furnished for setting the angle of the bend by limiting the travel of the Folding Bar. Two are positive stops which set the angle at either 45° or 90°. The third, an adjustable stop of split construction which turns on the left hand trunnion, can be clamped for any desired angle of bend.

## Adjustable gage sets width of folds

The Gage (Fig. 10), against which the sheet is held, is adjustable by means of a large knurled thumb screw for setting any width of fold within the range of the machine. The setting is plainly visible on a scale graduated in sixteenths of an inch. A small, knurled thumb screw locks the setting.

The steel Gage Bar which has a series of gaging points, is mounted on a steel Slide. The knurled adjusting screw acts on the Slide directly without linkage or other mechanical elements likely to wear and develop lost motion or inaccuracies. Springs below the Gage Slide keep the gage in close contact with the under side of the Folding Blade, so that the edge of the sheet to be folded cannot override the Gage.

## Jaw adjustable to thicknesses of material

Clamping pressure or clearance for various thicknesses of material within the capacity of the machine is regulated by raising or lowering the Cam Rollers, carried in the two shoes at either end, by means of adjusting screws (Figs. 8 and 9).

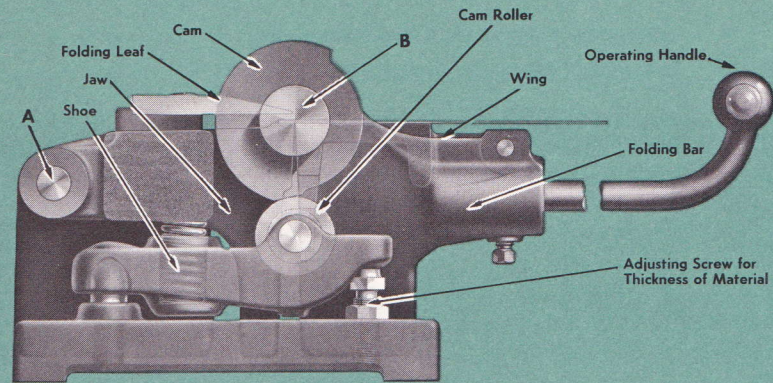


FIG. 8 Sheet in place ready for bending

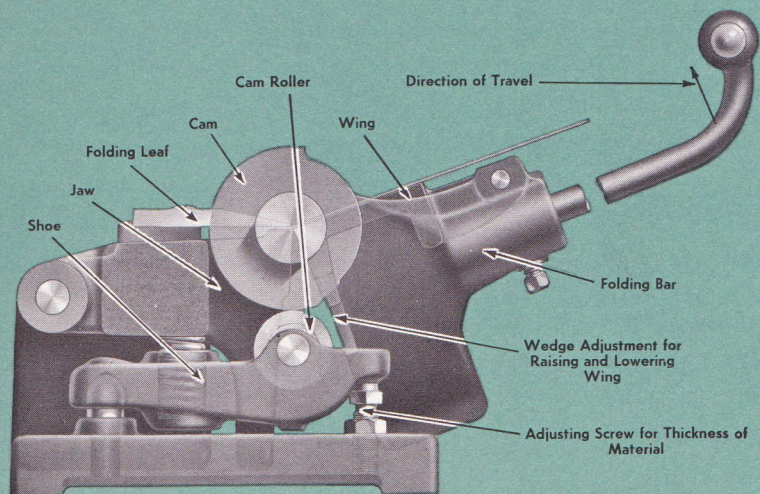


FIG. 9 Sheet Clamped — Bend Started

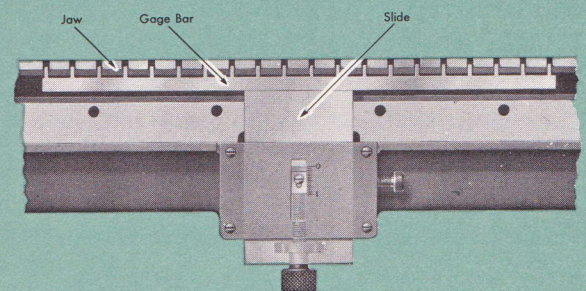


FIG. 10 Gage

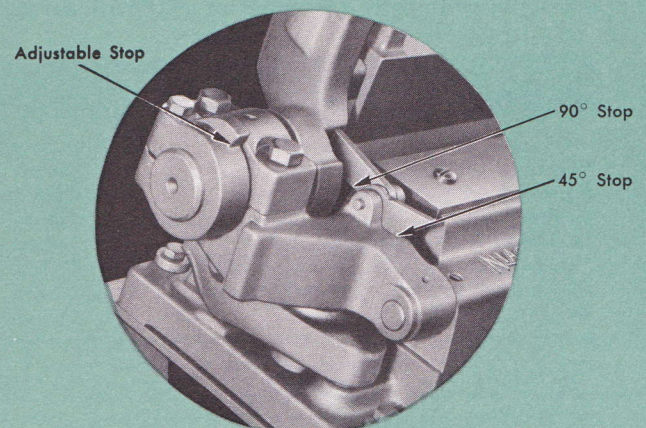


FIG. 11 Three Stops for Setting Angle of Bend



## Simple, rugged, precision-made mechanism assures accurate results

**The Folding Blade**, of special hard rolled steel accurately ground to a uniform thickness and straight edge, is fastened rigidly to the main frame.

**The Jaw**, pivoted at both ends (A), carries two large bearings for the trunnions (B) on which the Folding Bar turns.

**A pivoted Wing**, mounted on the Folding Bar and moving with it, is raised and lowered by a wedge adjustment (actuated by a rack and pinion mechanism) with locking nuts. Sharp bends, such as those commonly required for lock seams, are produced when the Wing is adjusted as shown in Fig. 9. Round bends, such as those required when inserting a wire for stiffening, are produced by lowering the Wing. Regardless of the position of the supporting wedges, the top of the Wing is always flush with the top of the Jaw, when the Bar Folder is in open or starting position. This alignment is assured by a guide pin under the Wing.

**Cams**, at both ends of the Folding Bar, are concentric

with the trunnions and are milled for uniform pressure.

The weight of the Folding Bar and Jaw assembly exerts a constant pressure of the Cams against the Cam Rollers which are carried in two shoes at the ends of the machine (Figs. 8 and 9).

When the machine is in the open or starting position (Fig. 8), the *low* part of the Cams is in contact with the Cam Rollers. As the operating handle is lifted (Fig. 9), the Folding Bar turns on its trunnions, rotating the Cams. This brings the *high* part of both Cams in contact with the Cam Rollers, *raising* the Folding Bar and Jaw and causing the latter to clamp the sheet between it and the stationary Folding Blade. As the operating handle is pulled further forward, it *turns* the Folding Bar and Wing, forming the bend, while the Cams maintain a constant clamping pressure on the sheet.

**Handle Sockets**, for right or left hand operation, are provided on both ends of Models 3, 4 and 5.

**A Counterbalance** for the heavier Folding Bar on Models 3, 4 and 5, is furnished as standard. Simple and efficient self-contained spiral spring counterbalance is designed to minimize operator fatigue and requires no additional bench space.

## air actuated models

Three of the Niagara Hand Operated Bar Folders (Models 3, 4 and 5) are available also in Air Actuated Models (Fig. 12). Incorporating basically similar features, they provide a convenient means of increasing production while reducing operator fatigue, and are ideally suited for production runs of narrow width work.

A foot operated valve and a speed regulator, fastened to the base of the floor stand, control the air flow to the actuating cylinder. Pressure on the pedal actuates the Folding Bar. With the initial movement of the piston the work is clamped between the Jaw and the Folding Blade. The folding progresses through to completion as the piston motion continues. Release of the pedal instantly reverses the action for fast and easy removal of the work.

Air pressure of 70 to 80 psi, used in the average shop, is all that is needed for satisfactory operation.

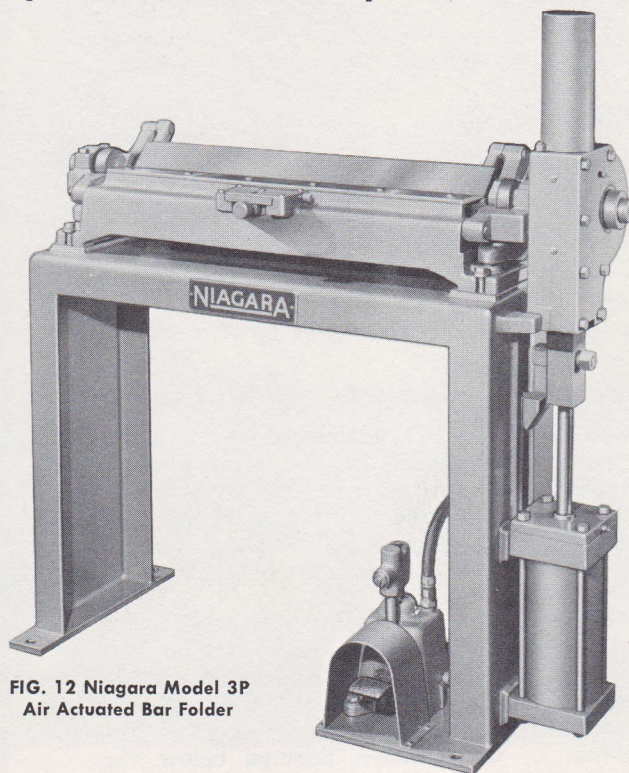


FIG. 12 Niagara Model 3P  
Air Actuated Bar Folder

## SPECIFICATIONS

### HAND AND AIR ACTUATED MODELS

MODEL	2	3	3P	4	4P	5	5P
Type	Hand	Hand	Air	Hand	Air	Hand	Air
Working length . . . . . Inches	21	30	30	36	36	42	42
Capacity, mild steel† . . . . . Gage No.	20	20	20	20	20	20	20
Gaging range* . . . . . Inches	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1
Widths of folds at capacity . . . . . Inches	$\frac{3}{16}$ to 1	$\frac{3}{16}$ to 1	$\frac{3}{16}$ to 1	$\frac{3}{16}$ to 1	$\frac{3}{16}$ to 1	$\frac{3}{16}$ to 1	$\frac{3}{16}$ to 1
Widths of folds No. 28 ga. mild steel and lighter . . . . . Inches	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1	$\frac{3}{32}$ to 1
Round folds for wire, maximum diameter . . . . . Inches	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Shipping weight . . . . . Pounds	130	235	670	355	800	455	1000

Many modifications of the standard Bar Folder are possible, to make it more suitable for a particular or unusual condition.

\*Can be increased up to  $1\frac{1}{2}$ " at extra charge. (Minimum gaging range is equally increased.)

†Capacity for hem closing is less, varying with the width and length of hem.



# NIAGARA

## FOOT BRAKE

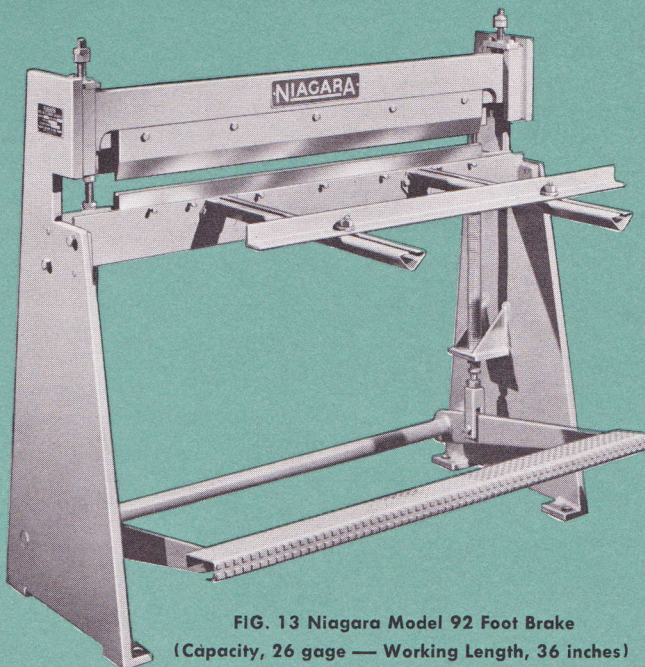


FIG. 13 Niagara Model 92 Foot Brake  
(Capacity, 26 gage — Working Length, 36 inches)



FIG. 14



FIG. 15 One operation

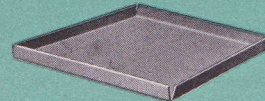


FIG. 16 Four operations

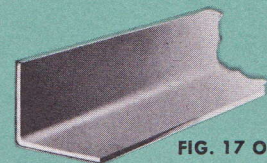


FIG. 17 One operation

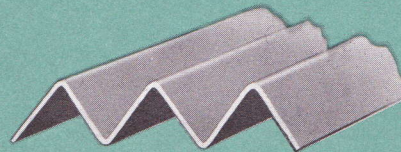


FIG. 18 Five operations

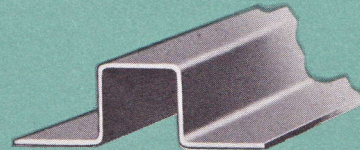


FIG. 19 Four operations

The Niagara Foot Brake is a very versatile machine that performs straight line bending operations on light sheet metal, particularly successive bends, reverse bends and folding four sides of pan-shaped articles (see Figs. 15-19). As differentiated from a bar folder, the bend may be any distance from the edge of the sheet.

Operation is simple. As the foot treadle is depressed, a "V" shaped punch descends vertically into a "V" shaped die to produce the bend. The standard punch

has a 30° included angle to permit the forming of sharp bends. The standard die has two grooves for bends of sharp or moderate radii. Special punches and dies for unusual bends are easily attached and are available at extra cost.

**The Gage**, for locating the bend, can be attached on either the front or rear of the machine.

**Adjustable Stops** on the slide regulate the angle of the bend.

**Air Actuated Model** is available also.

## SPECIFICATIONS | NIAGARA FOOT BRAKE

MODEL				92
Working length . . . . .			Inches	36
Nominal Capacity, 1/2" Vee die, 36" length:	Mild Steel . . . . .		Gage No.	26*
	Galvanized Steel . . . . .		Gage No.	28*
	1/4" Vee die, 36" length: Mild Steel . . . . .		Gage No.	28*
	Galvanized Steel . . . . .		Gage No.	30*
Gaging range . . . . .			Inches	1-24
Minimum acute angle . . . . .			Degrees	30
Female Vee die openings . . . . .			Inches	1/4, 1/2
Stroke of slide . . . . .			Inches	2
Distance center of slide to frame (gap) . . . . .			Inches	1
Shipping weight . . . . .			Pounds	525

\*Heavier gages may be bent in shorter lengths or by increasing width of female Vee die.



# NIAGARA

## UNIVERSAL FOLDERS AND BRAKES

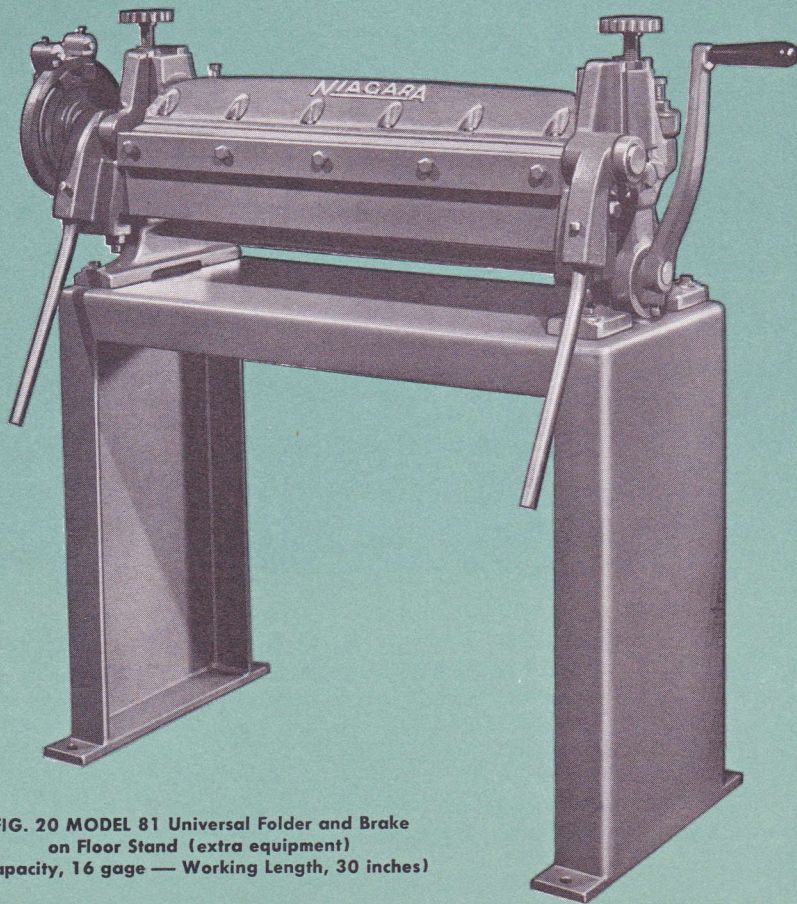


FIG. 20 MODEL 81 Universal Folder and Brake  
on Floor Stand (extra equipment)  
(Capacity, 16 gage — Working Length, 30 inches)

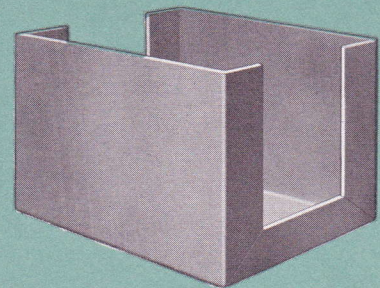


FIG. 21 Four operations with  
special slotted clamping blade

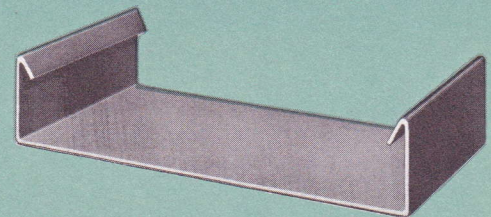


FIG. 22 Four operations

Niagara Universal Folders and Brakes are more versatile than bar folders, in that they can produce a fold of any width, and they surpass ordinary brakes in workmanship, accuracy and uniformity of performance.

Ideal for a variety of folding operations (Figs. 21 and 22) these machines are also exceptionally suited to quantity production. The fact that the main body of the sheet remains stationary during the bending operation, is important when working with large sheets. Adjustment is provided to produce rounded folds such as those which are used for wiring.

### **Operation is simple and rapid**

The sheet is inserted between the Clamping Bar and the Bed and held against the Gage. A half turn of the Crank brings down the Clamping Bar to grip the sheet. The Operating Handles are then swung upward, pivoting the Folding Bar, to produce the bend. Gripping pressure on the sheet is maintained by the Clamping Bar throughout the folding operation. The folded sheet is easily removed by merely reversing the movements.



## Design features enable wide range of work

**Front Gage for Narrow Folds** can be attached to the Folding Bar by removing the reinforcing bar.

**Back Gage for Wide Folds**, mounted on graduated rods, can be removed when not desired.

**Clamping Bar** is adjustable vertically to accommodate special or slotted Clamping Blades up to 2" thick.

**Clamping Blade**, around which the sheet is bent to produce sharp folds, is readily removable for substituting other blades to produce special formations, large radii, etc. Slots can be cut in the blade to clear previously folded transverse standing edges.

**Folding Bar**, all-steel and  $\frac{3}{8}$ " thick at upper edge, has a  $\frac{1}{2}$ " vertical adjustment for sharp folds or rounded bends up to  $\frac{1}{4}$ " radius. For maximum

capacity, when the Front Gage is not attached, the removable Reinforcing Bar is used, increasing the top thickness of the Folding Bar to 1".

**Two Adjustable Stops** at the left end of the machine can be set to produce any angle of bend by limiting the movement of the Folding Bar.

## Optional accessories (Extra Cost)

**Floor Stand.**

**Special Modifications** for producing unusual folds (quoted on receipt of *full details* of job):

- Clamping blade for rounded folds.
- Clamping bar for special work.
- Slotted clamping blade and bar.
- Special gages.

## SPECIFICATIONS

## NIAGARA UNIVERSAL FOLDERS AND BRAKES

MODEL		81	82
Working length . . . . .	Inches	30	42
Capacity — $\frac{3}{8}$ inch folds or wider . . . . .	Gage No.	16	20
Front gage range . . . . .	Inches	$\frac{1}{4}$ - $\frac{3}{4}$	$\frac{1}{4}$ - $\frac{3}{4}$
Back gage range . . . . .	Inches	$\frac{1}{4}$ -10	$\frac{1}{4}$ -10
Clamping bar — width, F to B . . . . .	Inches	6 $\frac{1}{2}$	6 $\frac{1}{2}$
Clamping bar — height . . . . .	Inches	3 $\frac{3}{4}$	4 $\frac{1}{4}$
Lift of clamping bar . . . . .	Inches	1	1
Shipping weight . . . . .	Pounds	400	500

## OTHER NIAGARA FOLDING EQUIPMENT

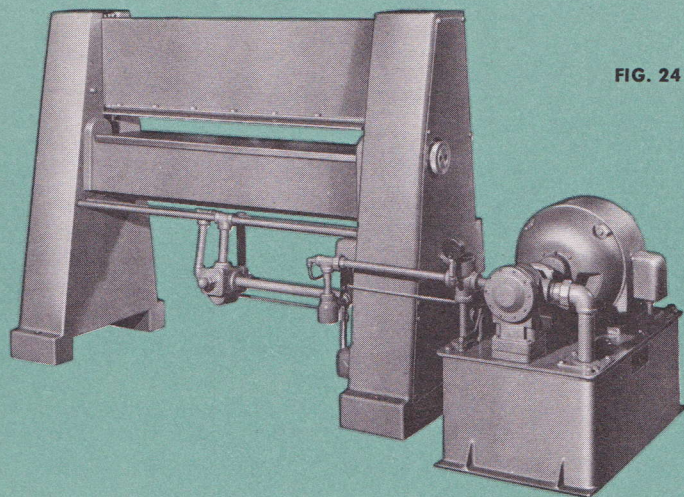


FIG. 23 Hydraulic Folder for high production. Engineered to meet specific requirements.



FIG. 24 Wood Roofing Folder (See Bulletin 78)

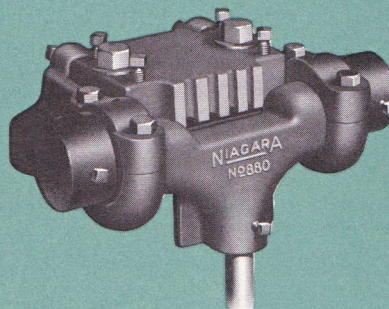
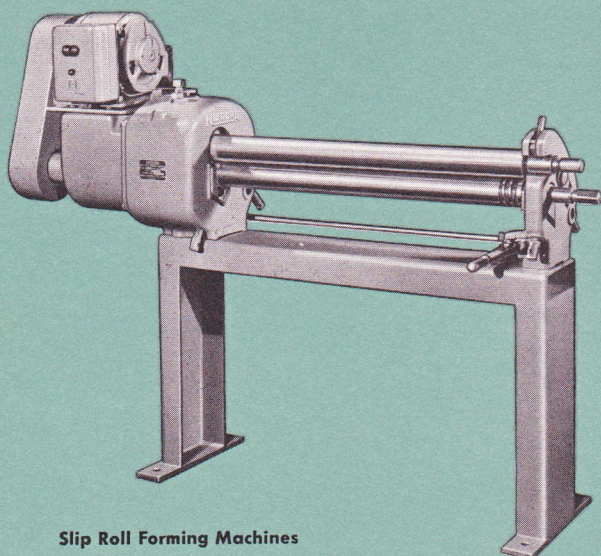


FIG. 25 Brace and Wire Bender (See Bulletin 78)

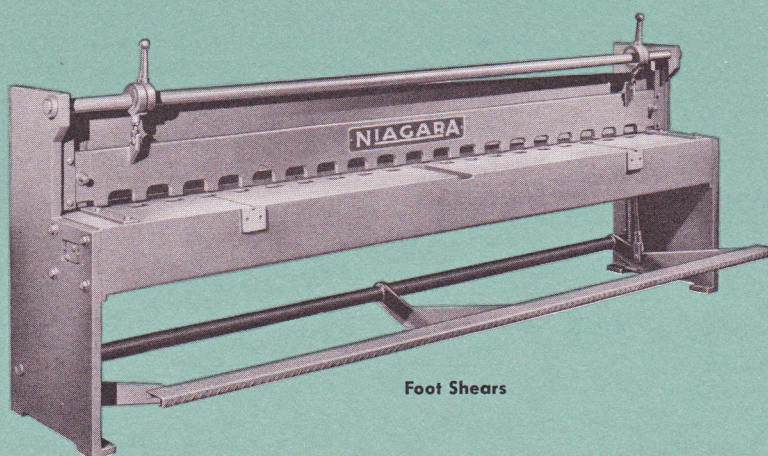


# NIAGARA

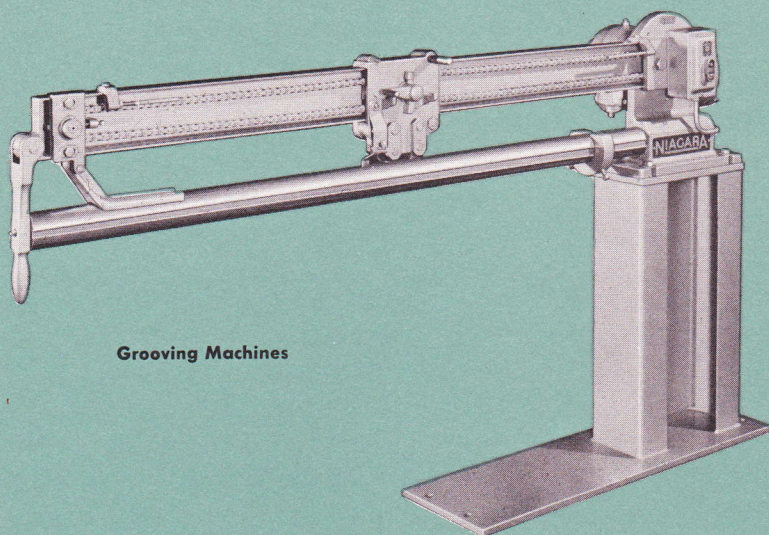
*America's most complete line of machines and tools for sheet metalworking*



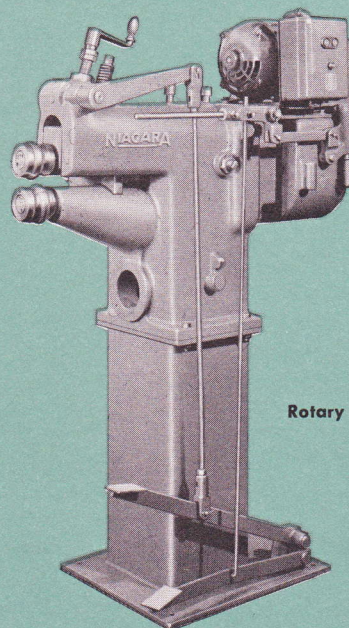
Slip Roll Forming Machines



Foot Shears



Grooving Machines



Rotary Machines

**PRESS BRAKES, LEVER PUNCHES AND SHEARS, TINNERS' HAND TOOLS**

## **NIAGARA MACHINE & TOOL WORKS**

General Offices and Works: 637-697 Northland Avenue, Buffalo 11, N. Y., U.S.A.

DISTRICT OFFICES: BUFFALO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA

Dealers in principal U. S. cities and major foreign countries